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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/639,587	08/13/2003	Toshiaki Okuno	50212-524	7692

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EXAMINER	
CURS, NATHAN M	
ART UNIT	**PAPER NUMBER**
2613	

MAIL DATE	DELIVERY MODE
10/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/639,587	OKUNO, TOSHIAKI	
	Examiner	Art Unit	
	Nathan Curs	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 July 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *4,8,9,15,19 and 20* is/are allowed.

6)☐ Claim(s) *1-3,5-7,10-14,16-18,21 and 22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 5, 12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al. ("Zhou") (US Patent Application Publication No. 2002/0021862), in view of Deng et al. ("Deng") (US Patent Application Publication No. 2002/0196491), and further in view of Essiambre et al. ("Essiambre") (US Patent Application Publication No. 2004/0208617), and further in view of Miller (US Patent No. 6044189).

Regarding claims 1 and 12, Zhou discloses an optical transmission system, comprising: an optical transmitter including a light source, said optical transmitter outputting signal light in a signal wavelength band and an optical receiver receiving the signal light outputted from said optical transmitter (fig. 1 and paragraph 0028); an optical fiber transmission line for transmitting the signal light outputted from said optical transmitter as a transmission medium provided between said optical transmitter and said optical receiver, said optical fiber transmission line having a positive chromatic dispersion at an operation wavelength of said direct modulation light source (fig. 1 and paragraphs 0034 and 0035); and at least one non-temperature controlled dispersion compensator provided on an optical path either between the signal outputting end of said optical transmitter and the signal entering end of said optical fiber transmission line (fig. 2c and paragraphs 0056 and 0057) or between the signal receiving end of said optical receiver and

the signal emitting end of said optical fiber transmission line (fig. 2a and paragraphs 0037-0040). Zhou discloses a WDM system but does not disclose that the optical transmitter light source is a non-temperature controlled direct modulation CWDM light source. Deng discloses that inexpensive, non-temperature controlled lasers in WDM systems can be used with sufficient wavelength spacing (abstract and paragraph 0016). It would have been obvious to one of ordinary skill in the art at the time of the invention to use non-temperature controlled lasers and sufficient wavelength spacing in the WDM, to avoid the additional cost associated with temperature controlled lasers, as taught by Deng. Zhou discloses that the dispersion after compensation is zero or a predetermined value of residual dispersion (paragraph 0040) and discloses a wavelength range for the dispersion compensation is a range without a zero-dispersion wavelength of said transmission line (fig. 2e and paragraph 0042), but does not explicitly disclose that, at either the signal emitting end of said optical fiber transmission line or at the signal receiving end of said optical receiver, respectively, the accumulated chromatic dispersion at the operation wavelength is set to negative. Essiambre discloses that using small negative residual dispersion results in better transmission performance than zero or slightly positive residual dispersion (paragraphs 0030, 0039 and 0040). It would have been obvious to one of ordinary skill in the art at the time of the invention to use dispersion compensation that produces small negative residual dispersion for the system of Zhou, in order to achieve the best transmission performance, as taught by Essiambre. Zhou does not disclose that the system operates over a temperature range of 0.degree.C. to 60.degree.C; however, Miller discloses that normal operating temperature for optical fiber system is –40.degrees.C to 80.degrees.C (col. 1, lines 16-19 and col. 4, lines 47-51). It would have been obvious to one of ordinary skill in the art at the time of the invention to operate the system of Zhou within the range of

0.degrees.C to 60.degrees.C since this is one of numerous acceptable operating ranges for an optical fiber system based on the teaching of Miller.

Regarding claims 5 and 16, the combination of Zhou, Deng, Essiambre and Miller discloses an optical transmission system according to claims 1 and 12, wherein said optical fiber transmission line includes a single-mode optical fiber (Zhou: paragraph 0034), which inherent has a zero-dispersion wavelength of near 1.3 .mu.m.

3. Claims 2, 3, 6, 7, 13, 14, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al. ("Zhou") (US Patent Application Publication No. 2002/0021862), in view of Deng et al. ("Deng") (US Patent Application Publication No. 2002/0196491), and further in view of Essiambre et al. ("Essiambre") (US Patent Application Publication No. 2004/0208617), and further in view of Miller (US Patent No. 6044189) as applied to claims 1, 5, 12 and 16 above, and further in view of Kartalopoulos ("Introduction to DWDM Technology"; IEEE Press; 2000; pages 50, 51 and 55).

Regarding claims 2 and 13, the combination of Zhou, Deng, Essiambre and Miller discloses an optical transmission system according to claims 1 and 12, further comprising a demultiplexer for demultiplexing a plurality of signal channels propagating through said optical fiber transmission line into one signal channel group in a first wavelength band and the other signal channel group in a second wavelength band (Zhou: fig. 2a), wherein said dispersion compensator compensates for the accumulated chromatic dispersion in the signal channel group of the second wavelength band (paragraphs 0037-0040), and wherein, at the signal outputting end of said dispersion compensator, the accumulated chromatic dispersion in one of the signal channels of the second wavelength band passing through said dispersion compensator is negative over the temperature range of 0.degree.C. to 60.degree.C (Essiambre:

paragraphs 0030, 0039 and 0040, and Miller: col. 1, lines 16-19 and col. 4, lines 47-51, as applicable in the combination). The combination of Zhou, Deng, Essiambre and Miller discloses WDM and EDFAs, but does not disclose that the first wavelength band includes a zero-dispersion wavelength of said optical fiber transmission line. However, Kartalopoulos discloses using dispersion-shifted fiber with a WDM system having a zero-dispersion point shifted at 1550 nm (pages 50 and 51, section 3.13). It would have been obvious to one of ordinary skill in the art at the time of the invention to use DSF with the WDM system of the combination, in order to provide the benefit of using fiber that is designed to be compatible with amplifiers that operating in the 1550 nm range for WDM, such as EDFAs.

Regarding claims 3 and 14, the combination of Zhou, Deng, Essiambre, Miller and Kartolopoulos discloses an optical transmission system according to claims 2 and 13, wherein, at the signal outputting end of said dispersion compensator, the accumulated chromatic dispersion in all the signal channels of the second wavelength band passing through said dispersion compensator is negative over the temperature range of 0.degree. C. to 60.degree. C (Essiambre: paragraphs 0030, 0039 and 0040, and Miller: col. 1, lines 16-19 and col. 4, lines 47-51, as applicable in the combination).

Regarding claims 6 and 17, the combination of Zhou, Deng, Essiambre and Miller discloses an optical transmission system according to claims 1 and 12, but does not disclose that said optical fiber transmission line, at a wavelength of 1.38 .mu.m, has a transmission loss smaller than a transmission loss at a wavelength of 1.31 .mu.m. Kartalopoulos discloses AllWave fiber, based on SMF with the OH radical removed, and where loss at 1380 nm is less than at 1310 nm (fig. 3.16 and page 55). It would have been obvious to one of ordinary skill in the art at the time of the invention to use AllWave fiber, to provide the benefit of more

wavelengths available in the transmission spectrum, due to the removal of the OH radical impact on transmission loss.

Regarding claims 7 and 18, the combination of Zhou, Deng, Essiambre and Miller discloses an optical transmission system according to claims 1 and 12, but does not disclose that said optical fiber transmission line has a zero-dispersion wavelength which exists in a wavelength range of 1.35 .mu.m to 1.5 .mu.m. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Kartalopoulos with the combination as described above for claims 2 and 13.

4. Claims 10, 11, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al. ("Zhou") (US Patent Application Publication No. 2002/0021862), in view of Deng et al. ("Deng") (US Patent Application Publication No. 2002/0196491), and further in view of Essiambre et al. ("Essiambre") (US Patent Application Publication No. 2004/0208617), and further in view of Miller (US Patent No. 6044189) as applied to claims 1, 5, 12 and 16 above, and further in view of Gabitov (US Patent Application Publication No. 2002/0048070).

Regarding claims 10 and 21, the combination of Zhou, Deng, Essiambre and Miller discloses an optical transmission system according to claims 1 and 12, but does not disclose pumping light supply means for supplying Raman-amplification pumping light into said optical fiber transmission line, so as to Raman-amplifying the signal light propagating through said optical fiber transmission line. Gabitov discloses opening up the 1300 nm range for WDM transmission in a WDM system by using Raman amp with a pumping light center at 1240 nm (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a Raman amp with a pump light centered at 1240 nm in the system of the

combination, to provide the benefit of opening the 1300 nm transmission window for greater WDM transmission, as taught by Gabitov.

Regarding claims 11 and 22, the combination of Zhou, Deng, Essiambre, Miller and Gabitov discloses an optical transmission system according to claims 10 and 21, wherein said pumping light supply means supplies the Raman-amplification pumping light of a plurality of pumping channels included in a wavelength range of 1.2 .mu.m to 1.3 .mu.m into said optical fiber transmission line (Gabitov: abstract, as applicable in the combination).

Allowable Subject Matter

5. Claims 4, 8, 9, 15, 19 and 20 are allowed.

Response to Arguments

6. Applicant's arguments filed 30 July 2007 have been fully considered but they are not persuasive.

Regarding claims 1, 5, 12 and 16, and depending claims, the applicant starts by stating that the combination of Zhou, Deng, Essiambre and Miller does not teach all the claimed limitations. The applicant's arguments actually seem to be based on assertions that the combination of references is improper, not that the combination fails to disclose the claimed limitations.

The applicant first argues that there is no "factual basis" for combining Zhou and Miller to read on the limitation "the accumulation is set to negative over a temperature range of 0°C to 60°C", specifically arguing that Miller teaches temperature in normal operation, but does not teach dispersion compensation, and does not teach normal operation performed in a condition of negative chromatic dispersion. However, Zhou already teaches dispersion compensation.

There is no requirement that Miller must duplicate this teaching for the combination to be proper. Also, the applicant's claim of setting negative accumulated dispersion in the range of 0°C to 60°C is effectively a claim to setting negative accumulated dispersion at typical environmental temperatures for fiber optic communications systems in the real world. The claimed range of 0°C to 60°C covers expected temperatures throughout the year at environmental locations where fiber optic communication systems are installed. This is a matter of common sense for one of ordinary skill in the art (e.g. NEBS testing of telecom equipment which dates back to the 1970s). The combination of Zhou and Essiambre already teaches accumulated negative chromatic dispersion, at inherently real world operating conditions for fiber optic transmission. There is no requirement that Miller must associate normal operating temperatures for fiber optical transmission specifically with negative accumulated chromatic dispersion for the combination to be proper. What Miller provides are some actual numbers associated with normal operation for fiber optic communication systems. In fact, the temperature range that Miller discloses for normal fiber optic system operation includes even more extreme min/max values than the applicant is claiming. The fiber optic systems of Zhou and Essiambre are already inherently operating normally in the real world; Miller simply provides some actual numbers corresponding to what expected, real world operating temperatures are for fiber optic communication systems.

Next the applicant argues that Essiambre's teaching of small negative residual dispersion is disqualified in the combination because of the specific embodiment of Essiambre, which the applicant says has the conditions of DWDM, a plurality of spans, dispersion compensation every span, 5000 km distance, etc. However, Essiambre doesn't disclose DWDM, and in any case, wavelength spacing between channels in WDM systems is not relevant to the impact of chromatic dispersion on individual channels. Also, the other features of

Essiambre do not disqualify it from use in the combination, because the applicable teaching of Essiambre in the combination is small negative residual dispersion at the end of transmission. The applicant doesn't claim any specific transmission distance, and there is no inherent transmission distance associated with "CWDM". Claiming a WDM system as specifically "CWDM" does nothing more than broadly saying something about wavelength spacing. Specific features from the applicant's specification and/or other features of CWDM systems known to the applicant are not automatically read into the claims simply by reciting "CWDM".

Next, the applicant argues that Zhou discloses DWDM and that the light sources of Deng are not used in DWDM systems. This is similar to a prior argument presented by the applicant. As described in the last office action, the combination of Zhou and Deng is based on modifying Zhou, including modifying Zhou to have the sufficient wavelength spacing required when using non-temperature controlled light sources like that of Deng. Zhou's generally use of the term "DWDM" does not disable the modification of Zhou's wavelength spacing based on Deng, because it's evident from Zhou's overall disclosure that Zhou is not concerned with any specific wavelength spacing, and is instead concerned with compensating for dispersion. The applicant also seems to argue that using Deng-like light sources in Zhou to decrease cost is inconsistent with using direct controlled dispersion compensators. This argument is not persuasive because the issue of using direct controlled dispersion compensators is irrelevant to the issue of reducing cost by using more inexpensive light sources.

Conclusion

7. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (800) 786-9199.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pairdirect.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SKLi

SHI K. LI
PRIMARY PATENT EXAMINER